

**A revision of the *Scopaeus debilis* species group,
with description of a new species from Madagascar
(Coleoptera, Staphylinidae, Paederinae)**

Johannes FRISCH

Institut für Allgemeine und Spezielle Zoologie, Justus-Liebig-Universität Gießen,
Stephanstr. 24, D - 35390 Gießen, FRG.

A revision of the *Scopaeus debilis* species group, with description of a new species from Madagascar (Coleoptera, Staphylinidae, Paederinae). - The *S. debilis* species group is defined. It comprises five species in the Old World, which are diagnosed with external morphological, genital and meristic characters, and for which distributional patterns are provided: *S. debilis* Hochhuth, *S. filiformis* Wollaston, *S. madagascarensis* sp. n., *S. mendosus* Fagel and *S. udus* Fagel. Seven new synonymies are established: *Scopaeus afghanicus* Scheerpeltz, *S. boops* Scheerpeltz, *S. ibericus* Coiffait = *S. debilis* Hochhuth, *Scopaeus richteri* Scheerpeltz, *S. schaeuffelei* Scheerpeltz, *S. schremmeri* Scheerpeltz, *S. tenuis* Eppelsheim = *S. filiformis* Wollaston. Lectotypes are designated for *Scopaeus filiformis* Wollaston, *S. infirmus* Erichson [= *Luzea infirma* (Erichson)], *S. richteri* Scheerpeltz, *S. schaeuffelei* Scheerpeltz, *S. schremmeri* Scheerpeltz, *S. scitulus* Baudi and *S. tenuis* Eppelsheim.

Key-words: Staphylinidae - Paederinae - *Scopaeus debilis* species group - West Palaearctic region - Afrotropical region - Oriental region - taxonomy - distribution.

INTRODUCTION

«Qu'est le *Scopaeus debilis* Hochhuth?» FAGEL (1959) asked in a contribution on this old species, which HOCHHUTH (1851) described from Armenia, and which according to earlier authors (e.g. BERNHAUER & SCHUBERT 1910; FAUVEL 1878, 1902; SCHEERPELTZ 1933) should be distributed widely across the West Palaearctic region and even in the Cape Verde Islands. Moreover, judging from specimens, which were determined by well-known specialists but not published, *S. debilis* was supposed to occur throughout Africa and Asia and even in Argentina (FAGEL 1959). The truth is that *S. debilis* has been confused with similar species, and BERNHAUER & SCHUBERT (1910) and SCHEERPELTZ (1933) in the Coleopterorum Catalogus considered both *S. scitulus* Baudi and the very widespread *S. filiformis* Wollaston as conspecific with

S. debilis. Without having seen type specimens of both *S. debilis* and *S. scitulus*, Fagel (1959) revalidated *S. filiformis*, but erroneously revalidated *S. scitulus*, which in fact is a younger synonym of *S. debilis*, and applied the name *S. debilis* to a then undescribed species, which COIFFAIT (1968) later named *S. talyschensis*. In consequence of that even until now both the names *S. debilis* and *S. scitulus* were used for the same species. Only recently, GUSAROV (1992) fixed the name *S. debilis* by designating a lectotype.

In his revision of Afrotropical *Scopaeus* species FAGEL (1973) already combined Central African species related to *S. debilis* in a species group, which he named the *S. tenuis* group according to the African *S. tenuis* Eppelsheim. Because this name is a junior synonym of *S. filiformis* and because *S. debilis* is the best known species in the group and has the longest use, the present author uses the name *S. debilis* species group.

When examining the available type specimens of all *Scopaeus* species from the Old World, the author recognized seven additional synonyms of *S. debilis* or *S. filiformis*. Within the material from the Muséum National d'Histoire Naturelle, Paris, a new species from Madagascar, which fits the *S. debilis* group, was discovered. The *S. debilis* group currently comprises five species, which are widespread in Europe, Africa and Asia.

The present revision gives a definition of the *S. debilis* species group and provides descriptions of the five species together with ecological and distributional informations.

MATERIAL AND METHODS

This revision is based on type material and on additional material from the institutions and private collections listed below. Detailed data from labels are given only for type specimens. Under synonymy, only primary references are given.

- BMNH = The Natural History Museum, London
- DEIC = Deutsches Entomologisches Institut, Eberswalde
- FCNB = Frey Collection, Naturhistorisches Museum, Basel
- FMNH = Field Museum of Natural History, Chicago
- GRCL = G. de Rougemont Private Collection, London
- HECO = Hope Entomological Collections, Oxford
- HNHM = Hungarian Natural History Museum, Budapest
- ISNB = Institut Royal des Sciences Naturelles de Belgique, Brussels
- JFCG = J. Frisch Private Collection, Gießen
- JJCU = J. Janák Private Collection, Ústí nad Labem
- LSNK = Landessammlungen für Naturkunde, Karlsruhe
- MCSN = Museo Civico di Storia Naturale «Giacomo Doria», Genova
- MHNG = Muséum d'histoire naturelle, Genève
- MKCH = M. Kahlen Private Collection, Hall in Tirol
- MLZT = Museo di Zoologia Sistemática della Università, Turin
- MNHN = Muséum National d'Histoire Naturelle, Paris
- MRAC = Musée Royal de l'Afrique Centrale, Tervuren
- MSCB = M. Schülke Private Collection, Berlin
- MZCO = Zoological Museum, Copenhagen
- MZKI = Zoological Museum, Kiev
- MZLU = Zoological Museum, Lund

- NHMB = Naturhistorisches Museum, Basel
 NHMC = Natural History Museum and Institute, Chiba
 NHMW = Naturhistorisches Museum, Wien
 NMEC = Naturkundemuseum, Erfurt
 SMTD = Staatliches Museum für Tierkunde, Dresden
 SMNS = Staatliches Museum für Naturkunde, Stuttgart
 SMWN = State Museum of Namibia, Windhoek
 TMSA = Transvaal Museum, Pretoria
 VACH = V. Assing Private Collection, Hannover
 ZMHB = Museum für Naturkunde, Berlin
 ZSMC = Zoologische Staatssammlung, München

The terminology of the aedeagus follows FRISCH (1994), and the spermatheca and the sclerites of the genital segments are termed as in FRISCH (1996). The illustrations of the male abdominal sternites lack the fine primary setae. Abdominal sternites and tergites are counted from the morphological first segment. Measurements and ratios are based on ten specimens at least, which include both sexes and the maximum range of variation in body size and form. They are defined and abbreviated as follows:

Total length = interval from the apical margin of the mandibles to the end of the abdomen, pending on the state of the specimens; forebody length = interval from the apical margin of the mandibles to the posterior margin of the elytra at the suture; length of head = interval from the apical margin of the clypeus to the posterior margin; HLW = head length : head width; PLW = pronotal length : pronotal width; HPW = width of head : pronotal width; HPL = length of head : pronotal length; PSL = pronotal length : elytral sutural length (excluding scutellum); PLL = pronotal length : elytral lateral length; ELW = elytral lateral length : elytral width; ET = eye length : temporal length (both measured laterally); MT = mesotibial length : mesotibial width; A = length (measured without the basal and distal tapering) : width of the antennal segments 1-11; T = length : width of the central area (between the sclerite margins) of the tergite 10; V = length : width of the central area of the female valve.

TAXONOMY OF THE *SCOPAEUS DEBILIS* SPECIES GROUP

FAGEL (1959, 1973) already mentioned the conspicuous morphological similarity of the species of this group, which might be easily distinguished by the quite small (2.4-3.1 mm; forebody 1.4-1.7 mm) and little convex, more or less light brown coloured body and by the discernibly narrow protarsomeres 1-4, which are slightly wider than long, and which in most remaining species groups are notably wider. Because of the fine, dense microsculpture, which overlies the indistinct puncturation, especially the forebody of the species appears relative dull with exception of *S. madagascarensis* sp. n., of which the forebody is not microsculptured but clearly punctured and shining. While *S. debilis* from the West Palaearctic region is the largest and most darkly coloured species of the group, and while *S. madagascarensis* sp. n. differs by the unicolorous light orange brown, shining body, the remaining species are hard to

identify without the male sexual characters. The head is relatively slender (HLW 1.12-1.23) and widest on the level of the eyes, because the tempora are not enlarged but about parallel or in most specimens somewhat narrowed toward the strongly rounded hind angles. The hind margin of the head is straight or slightly convex. The appendages are relatively slender. The distal antennomeres are about quadrate, and the mesotibia is slender (MT 5.6-7.2) but not thickened as in several species groups of *Scopaeus*. Because the species of the *S. debilis* group without exception are good flyers, they are characterized furthermore by relative large eyes (ET 0.67-0.88), which are little shorter than the tempora, entire metathoracic wings and quite long elytra, which are at the suture about as long as the pronotum or up to a seventh longer (PSL 0.84-1.05), and which are distinctly exceeding the pronotal length laterally by about a seventh up to a third (PLL 0.69-0.85).

The laterotergites 9 (figs 27-30) have an obtuse, dorsal dilatation and a very slender, distal tooth. The tergites 10 (figs 31-35) and the valves (figs 36-40) are relative slender. Sternites 8 in the male bear a medio-apical incision, which is very short and triangular in *S. filiformis* (figs 20, 21), *S. mendosus* (fig. 23) and *S. madagascarensis* (fig. 24), or which is extended into a conspicuously narrow, median incision in about the distal fifth (*S. debilis*, fig. 19; *S. udus*, fig. 22).

The shape of the aedeagi generally fits the description of the aedeagus in *Scopaeus* by FRISCH (1994). Because the aedeagi of the species of the *S. debilis* group are quite different in some characters, no general description is provided here (see also discussion). The spermathecae of the species treated here also fit the basic form in *Scopaeus* as shown by FRISCH (1996), but they are distinguished by a distinct lateral branch of the ductus (see arrow in figs 46, 47).

Scopaeus debilis Hochhuth

Figs 1-3, 19, 27, 31, 36, 41, 42

Scopaeus debilis Hochhuth, 1851: 50. Lectotype ♀. Armenia, Chadoir (MZKI); designated by GUSAROV (1992); examined.

Scopaeus (Scopaeus) debilis; COIFFAIT 1952: 7.

Scopaeus (Hyposcopaeus) debilis; COIFFAIT 1960: 285.

Scopaeus scitulus Baudi, 1857: 103. Lectotype ♂. Italy, Piedmont (MLZT); here designated (examined); synonymized by FAUVEL 1886: 36.

Scopaeus (Hyposcopaeus) scitulus; COIFFAIT 1960: 285.

Scopaeus boops Scheerpelz, 1931: 411. Holotype ♀. Greece. Corfu. Potamos, 01.04.1929, Beier (NHMW); examined. Syn. n.

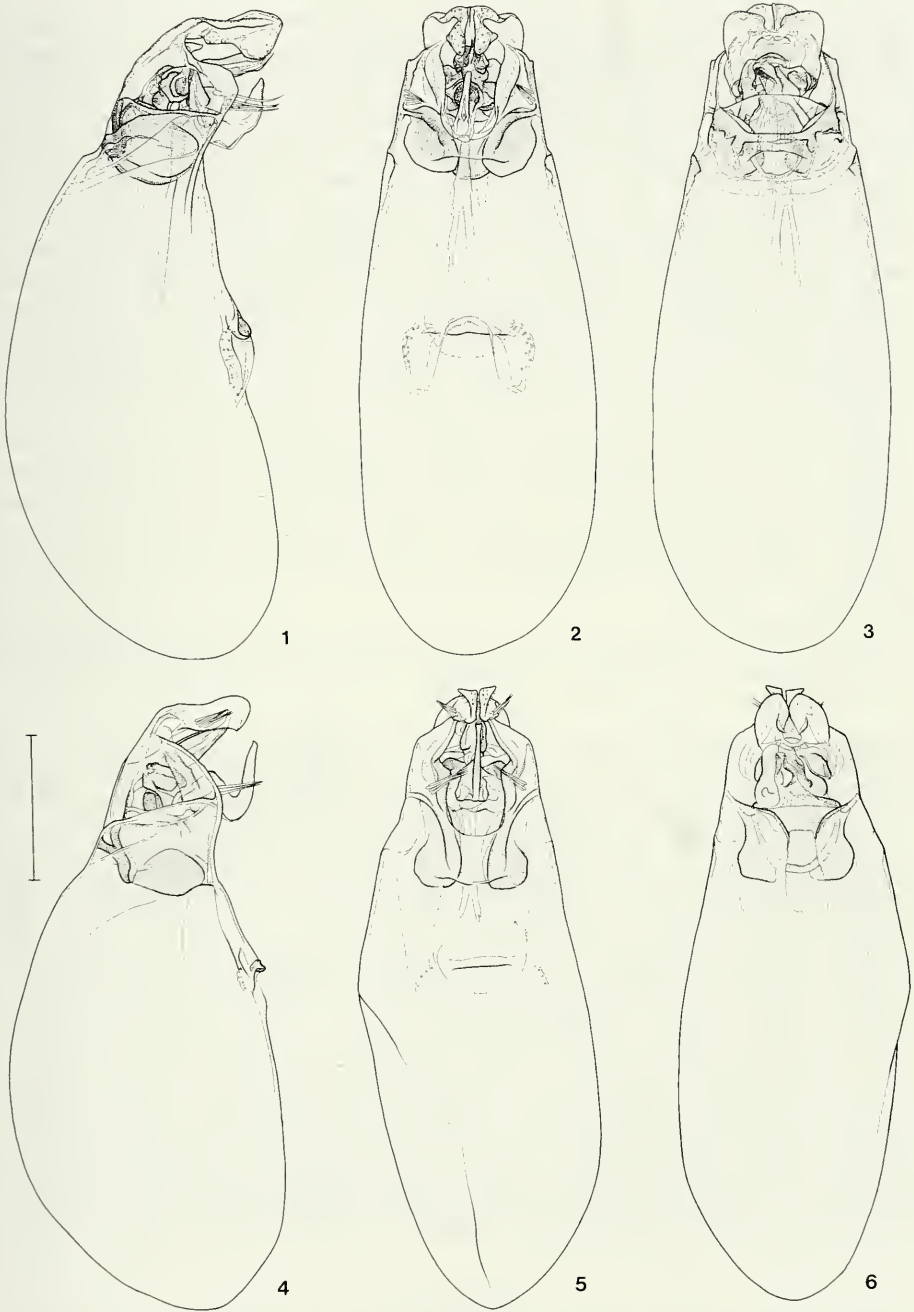
Scopaeus (Hyposcopaeus) ibericus Coiffait, 1952: 6. Holotype ♂. Spain, Murcia, 10.04.1950, Coiffait (MNHN); examined. Syn. n.

Scopaeus afghanicus Scheerpelz, 1960: 76. Holotype ♂. Afghanistan, Kabul, Gilli (NHMW); examined. Syn. n.

Scopaeus (Hyposcopaeus) afghanicus; COIFFAIT 1984: 190.

Scopaeus debilis Ganglbauer, 1895; BOHÁČ *et al.*, 1993: 46.

DESCRIPTION. Length 2.9-3.1 mm; forebody 1.6-1.7 mm. Body usually dark brown to blackish brown with about the distal half of the elytra and the appendages lighter brown, except the femora, the antennae from segment 3 and the penultimate segment of the maxillary palpi. Elytra frequently lightened gradually toward the hind margin.



FIGS 1-6

Scopaeus debilis, ♂, Tunisia, Kasserine: aedeagus in 1) lateral, 2) ventral, 3) dorsal view.
S. filiformis, ♂ lectotype: aedeagus in 4) lateral, 5) ventral, 6) dorsal view. Scale bar = 0.1 mm.

but often the light brown colour is set off against the dark basal half and somewhat extended along the suture. Frequently the dark brown colour of the elytra is extended or reduced more or less, and specimens with evenly light brown elytra occur. Specimens from Near East (Kazakhstan, Turkmenistan) usually differ by an even light brown body with a slightly darker head and light brown elytra. Mesotibia very slender, 6.4 to 6.9 times longer than wide. Distal antennomeres feebly transverse. Male sternite 8 (fig. 19) with a very narrow, parallel incision at about the distal fifth and notably concave distolateral margins. Aedeagus (figs 1-3) somewhat bean-shaped, with relatively short apical lobes, which in ventral view are strongly dilated and ventrally bent at the base, and of which the distal halves are dilated and rounded toward the apex in lateral view. Dorsal margins of the apical lobes strongly bent laterally, each forming a deep, lateral groove in ventral view. Dorsal lobe very short, hardly visible in dorsal view, regularly bent ventrally and in lateral view somewhat projecting from the base of the apical lobes. Lateral lobes prominent and nearly semicircular in lateral view, forming an obtuse angle in dorsal view, each bearing a group of few, long setae. Endophallic spine strongly enlarged but shortly filiform at the apex, reaching the apex of the apical lobes. Ventral endophallic process very narrow in ventral view, dilated and strongly hooked distally in lateral view. Spermatheca (figs 41, 42) variable with process very slender and chamber triangular.

RATIOS. HLW 1.16-1.23; PLW 1.17-1.35; HPW 1.06-1.12; HPL 0.98-1.07; PSL 0.84-0.97; PLL 0.69-0.78; ELW 1.21-1.31; ET 0.67-0.86; MT 6.4-6.9; A 2.6, 1.4, 1.7, 1.4, 1.2, 1.2, 1.2, 1.1, 1.1, 1.1, 1.8; T 2.1; V (♀) 6.4.

MATERIAL EXAMINED (1133 specimens). Afghanistan: holotype ♂ of *S. afghanicus*, Kabul (NHMW); Farah (NHMW); Herat (MNHN); Kabul (NHMW); Kapiza (LSNK); Konduz (MNHN, NHMW); Quandahar (NHMW). Albania (NHMW). Algeria: Beskra (BMNH, MNHN); Lemdiyya (ISNB); M'Sila (MNHN); Tizi-Ouzou (MNHN). Armenia: lectotype ♀ of *S. debilis* (MZKI). Austria: Burgenland (MKCH). Azerbaijan (NHMW). Bosnia-Herzegovina (BMNH, DEIC, HNHM, MHNG, NHMW, SMTD, ZMHB). Bulgaria: Bács-Kiskun (NHMW); Blagoevgrad (JFCG, NHMB, ZMHB); Burgas (FCNB, MNHN); Varna (NHMW). Croatia (FCNB, MNHN, NHMW, VACH). Cyprus: paralectotype ♀ of *S. scitulus* (DEIC); (DEIC, ISNB, JFCG, MCSN). France: Alpes-Maritimes (SMFD, MHNG, MNHN); Ariège (MNHN); Haute-Corse (DEIC, MHNG); Haute-Garonne (MNHN); Hautes-Pyrénées (FCNB); Pyrénées-Antiques (MNHN); Pyrénées-Orientales (MNHN); Tarn (MNHN); Var (MHNG); Vaucluse (HNHM, MNHN). Georgia (ZMHB). Greece: holotype ♀ of *S. boops*, Corfu, Potamos (NHMW); Attici (MNHN, NHMW); Corfu (ZMHB); Crete (MHNG, NHMW); Kos (MZLU); Naxos (JFCG); Parnassos (JFCG); Peloponnese (JFCG, NHMB); Pindhos Óros (MNHN); Thessaloniki (MNHN). Hungary: Hajdú-Bihar (HNHM); Pécs (VACH); Somogy (HNHM); Szabolcs-Szatmár-Bereg (HNHM). Iran: Azarbaijan - E Sharqi (NMPC); Gilan (HNHM); Khorasan (NHMW); Tehran (HNHM, NHMW); Zanjan (NMPC). Iraq (HNHM). Israel: Hefa (NHMW); Tel Aviv (NHMW). Italy: lectotype ♂ and paralectotypes 4 ♀ (MLZT) and 2 ♂, 6 ♀ (DEIC) of *S. scitulus*, Piedmont: Calabria (MHNG); Emilia-Romagna (MNHN, ZMHB); Friuli-Venezia Giulia (MKCH, MSCB); Liguria (DEIC, MCSN, MNHN, NHMW); Piedmont

FIGS 7-12

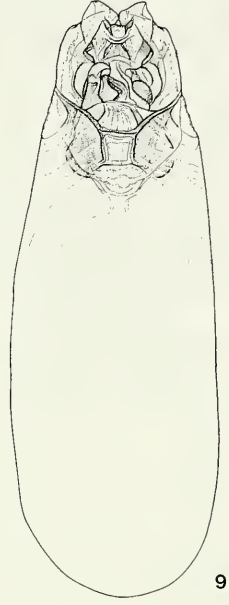
Scopaeus filiformis. ♂, Namibia, Kavango: aedeagus in 7) lateral view. *S. filiformis*, ♂, Egypt, Cairo: aedeagus in 8) lateral, 9) dorsal view. *S. udus*, ♂, Namibia, Kavango: aedeagus in 10) lateral, 11) ventral, 12) dorsal view. Scale bar = 0.1 mm.



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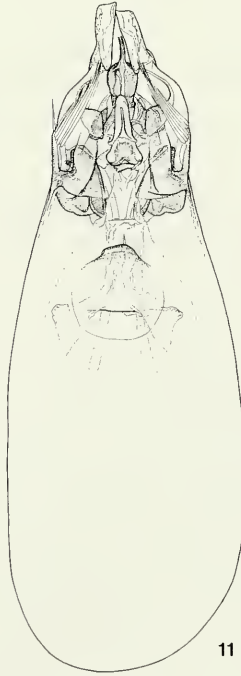
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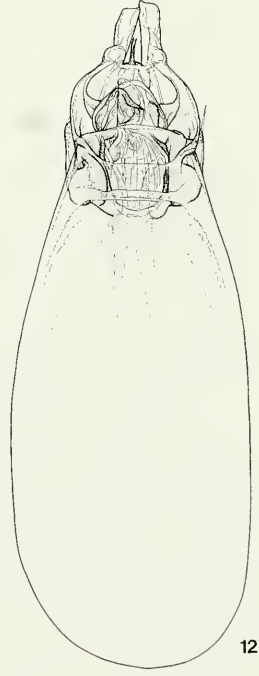
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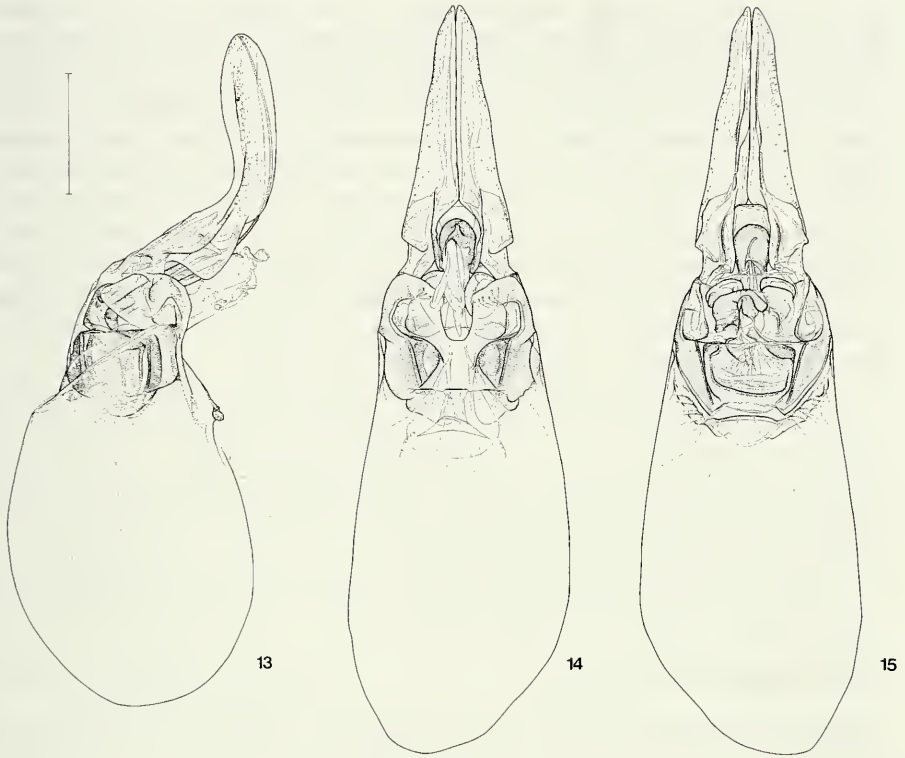
(DEIC, HNHM, MNHN, NHMW); Sardinia (VACH); Sicily (MZCO, MZLU, NHMW); Trentino-Alto Adige (JFCG, MNHN); Tuscany (DEIC, MNHN, SMTD); Veneto (ZMHB). Kazakhstan: Cimkent (NHMW); Dzambul (NMEC). Lebanon: Jabal Lubnan (NHMW). Malta (BMNH). Morocco: Fès (MNHN); Marrakech (FCNB, MNHN); Taza (MNHN). Portugal: Beja (MNHN); Faro (MNHN). Romania: Dobruja (NHMW); Tulcea (HNHM). Russia: Volgograd Oblast (ZMHB). Slovenia (MHNG). Spain: holotype ♂ of *S. ibericus*, Murcia (MNHN); Andalucia (BMNH, DEIC, ISNB, MHNG, MNHN, MZLU); Valencia (MHNG). Switzerland: Ticino (NHMG). Syria: Aleppo (JFCG). Tadshikistan: Gissarskij Chrebet (NHMW); Kul' Ab (JFCG); Taldy-Kurgau (JFCG). Tunisia: Gafsa (FMNH); Kairouan (JFCG); Kasserine (JFCG); El Kef (JFCG, NHMW, ZMHB); Tunis (FMNH). Turkey: Adana (JFCG, NMPC); Ankara (MNHN); Antalya (JFCG, NHMB, VACH); Aydin (NHMB); Hakkari (JFCG); Icel (NHMB); Istanbul (BMNH, MHNG); Izmir (VACH); Kocaeli (BMNH); Mardin (NHMW); Mugla (JFCG); Yosgat (JFCG). Turkmenistan: Cardzou (NHMW); Tasauz (JFCG); Ukraine: Odessa (JFCG).

DISTRIBUTION. *Scopaeus debilis* is a Western Palaearctic species and widely distributed in the Mediterranean region and in Middle East reaching the Hindu Kush Mountains in Afghanistan. The distributional pattern of *S. debilis* appears to follow mountainous regions, and the species obviously avoids lowland deserts. Thus, while *S. debilis* is widespread around the Mediterranean Sea and on the Mediterranean islands, it is still unknown from Libya, Egypt and the deserts in the Near East and in the Arabian Peninsula. In North-West Africa, the Sahara is the southern distributional barrier, and the range obviously follows the Atlas Mountains, where *S. debilis* is recorded south-westwards to Marrakech. The northernmost finds are confirmed from Central France (Indre region: COIFFAIT 1968), South Switzerland (Ticino), North Italy, Austria (Burgenland), Slovakia, the Danube plain in Romania, the Russian Volgograd and South Kazakhstan (Cimkent, Dzambul). The westernmost records are from Portugal and the Western Pyrenees. In Near and Middle East, the distribution is confirmed southwards to Israel (Tel Aviv), Iraq, the Iranian region Khorasan and Quandahar in Afghanistan.

Scopaeus debilis reaches Central Europe only in the extreme south, and several records have to be rejected. According to specimens from his collection, Scheerpeltz (in litt., in HORION 1965) mentioned *S. debilis* from all Austrian regions. In fact, there is not one specimen from Austria in the Scheerpeltz collection (NHMW). In Austria, *S. debilis* is confirmed only from the Ponto-Mediterranean influenced Burgenland (MKCH). Furthermore, the record of *S. debilis* from Moravia (Opava: REITTER 1909; BOHAC 1985) appears little plausible, and BOHAC *et al.* (1993) later doubted the autochthonous presence in the Czech Republik and Slovakia. Only recently, JASZAY & BOHAC (1994) gave a plausible record of *S. debilis* from Slovakia.

Records of *S. debilis* from Saudi Arabia (Ar-Riyad, Al-Hufuf: COIFFAIT 1981), Central Algeria (El Golea: FAUVEL 1902), Egypt (Cairo: FAUVEL 1878, 1886, 1902; Lower Egypt: FAGEL 1959) and from the Cape Verde Islands (BERNHAEUER & SCHUBERT 1910) refer certainly to *S. filiformis*, which FAUVEL (1902) and many subsequent authors mistook for a synonym of *S. debilis*.

BIONOMICS. BOHAC (1985) and HORION (1965) considered *S. debilis* to be a xerothermophilous species which lives in dry places like xerothermous or sandy meadows, embankments and hillsides, and which was also found in nests of *Formica rufa* (Hymenoptera: Formicidae). This ecological characterisation has to be rejected. As



FIGS 13-15

Scopaeus mendosus, ♂ paratype, Zaire, Haut-Zaire: aedeagus in 13) lateral, 14) ventral, 15) dorsal view. Scale bar = 0.1 mm.

most *Scopaeus* species, *S. debilis* is a thermo-hygrophilous inhabitant of damp, sunny margins and banks of rivers and streams, obviously preferring sandy or gravelly river banks without muddy sediments and rich vegetation. *Scopaeus debilis* occurs from sea-level up to high-altitude valleys, and in the Iranian Elburz Mountains it is confirmed from 2000m above sea-level.

COMMENTS. HOCHHUTH (1851) gave no information about the number of specimens from which he described *S. debilis*. The only available original specimen (MZKI) was designated as lectotype by GUSAROV (1992). *Scopaeus scitulus* was described for specimens from Piedmont (Po river) and Cyprus (BAUDI 1857). The specimens in the Baudi collection (MLZT) bear no locality labels, but according to the description (BAUDI 1857) they are from Piedmont. When describing *S. scitulus*, BAUDI (1857) erroneously distinguished the species from *S. debilis* by the alleged smaller size and longer antennae. FAUVEL (1873a, 1873b) doubted that both were distinct species, and later (FAUVEL 1886) he synonymized *S. scitulus* and gave several records under the name *S. debilis*, which partly refer to *S. filiformis*, which FAUVEL (1902) also considered to be a synonym of *S. debilis*.

While many authors used the correct name *S. debilis* (e.g. BERNHAUER & SCHUBERT 1910; BINAGHI 1935; CICERONI *et al.* 1995; GANGLBAUER 1895; PORTA 1926; SCHEERPELTZ 1925, 1931), others treated the species under its younger synonym *S. scitulus*. First of all MULSANT & REY (1877) and PORTEVIN (1929) overlooked the name *S. debilis*. Recently FAGEL (1959) misinterpreted *S. debilis* and, while using the younger synonym *S. scitulus*, applied the name *S. debilis* to *S. talyschensis* Coiffait (GUSAROV 1992), which does not belong to the *S. debilis* group. I saw the holotype of *S. talyschensis* (MNHN) and agree with Gusarov's representation. While COIFFAIT (1952) in his paper on French *Scopaeus* species first used the name *S. debilis*, he later followed FAGEL (1959) and treated the species under the younger synonym *S. scitulus* (COIFFAIT 1968, 1981, 1984) just as have many recent authors (e.g. BOHAC *et al.* 1993; BOHAC 1985, 1994; HORION 1965; LOHSE 1964; LUCHT 1987).

Concerning the occurrence in Central Europe, Scheerpeltz (in litt. 1964) informed HORION (1965) that the Central European form was *S. debilis*, while *S. scitulus* is a different species from the Mediterranean region. This statement is completely absurd. Furthermore, BINAGHI (1939) falsely applied the name *S. boops*, which in fact is a synonym of *S. debilis*, to a then undescribed species, which the author later (FRISCH 1994) named *S. graecus*.

Scopaeus debilis must not be confused with *S. minutus* var. *debilis* Mulsant & Rey, which is a synonym of *S. minutus* (FRISCH 1997).

Scopaeus filiformis Wollaston

Figs 4-9, 20, 21, 32, 37, 43, 44

Scopaeus filiformis Wollaston, 1867: 243. Lectotype ♂, Cape Verde Is. (BMNH); here designated (examined); synonymized with *S. debilis* by FAUVEL 1902: 85; revalidated by FAGEL, 1959: 5.

Scopaeus (Hyposcopaeus) filiformis; COIFFAIT 1960: 285.

Scopaeus tenuis Eppelsheim, 1885: 128. Lectotype ♂, Ghana (Côte d'Or). "Adda" (NHMW); here designated (examined). Syn. n.

Scopaeus schaeuffelei Scheerpeltz, 1961: 5. Lectotype ♂, Iran, Sistan Va Baluchestan, Iranshar, 800m, 1.-10.04.1954, Richter & Schäuuffele (NHMW); here designated (examined). Syn. n.

Scopaeus (Hyposcopaeus) schaeuffeli; COIFFAIT 1984: 190 (misspelling).

Scopaeus richteri Scheerpeltz, 1961: 5. Lectotype ♂, Iran, Jiroft, Anbar-Abad, 21.-30.04.1956, Richter (SMNS); here designated (examined). Syn. n.

Scopaeus schrenneri Scheerpeltz, 1963: 437. Lectotype ♂, Egypt, Assuan, 17.01.1962, Nubia expedition of the NHMW (NHMW); here designated (examined). Syn. n.

Scopaeus (Hyposcopaeus) infirmus; COIFFAIT 1960: 288.

DESCRIPTION. Length 2.4-2.8 mm; forebody 1.4-1.6 mm. Body usually light brown with appendages and frequently the pronotum lighter yellowish brown, and with the head and the elytra somewhat darker. Often the elytra are clearly blackened except the humeral callus, the distal fourth and the suture, which are light yellowish brown. Frequently unicolorously light brown specimens with a slightly lighter, yellowish pronotum occur. Distal antennomeres about quadrate. Male sternite 8 (figs 20, 21) with a variable, triangular emargination at about the distal tenth, which in most specimens is slightly acute-angled extended proximally, and with regularly rounded hind margins. Aedeagus (figs 4-9) similar to that of *S. debilis* (figs 1-3), but not

curved and somewhat smaller, furthermore distinguished by the following characters: apical lobes in lateral view only slightly widened toward the apex, which is rounded distally and somewhat hooked proximally, and each bearing a lateral group of few, long setae. Apex of the apical lobes in ventral view dilated triangularly and truncate distally. Ventral endophallic process in lateral view less widened and stronger hooked-shaped. Frequently specimens occur, in which the aedeagus appears to differ by little raised apical lobes, which are retracted between the lateral lobes, and of which the apices are invisible in dorsal view (figs 8, 9). In specimens from southern Africa (Namibia, Botswana, South Africa) the aedeagus appears more stubby with the apical lobes and the ventral endophallic process somewhat shorter and broader (fig. 7). Spermatheca (figs 43, 44) variable with process and chamber notably widened.

RATIOS. HLW 1.12-1.23; PLW 1.19-1.26; HPW 1.06-1.12; HPL 0.98-1.09; PSL 0.9-1.0; PLL 0.71-0.8; ELW 1.13-1.29; ET 0.71-0.88; MT 5.7-6.7; A 2.3, 1.8, 1.6, 1.5, 1.3, 1.2, 1.2, 1.0, 1.0, 1.0, 1.9; T 2.1; V (♀) 6.4.

MATERIAL EXAMINED (2622 specimens). Algeria: Tassili Najjer (MNHN). Angola: Benguela (MRAC). Botswana: Chobe (ZMHB); Ngamiland (BMNH, JFCG, ZMHB). Cameroon: Nord (MRAC). Cape Verde Is.: lectotype ♂ (BMNH) and paralectotypes 1♂ (ISNB), 1♂ (HECO) and 7♀ (BMNH) of *S. filiformis*: (DEIC, ZMHB). Chad: Kanem (MRAC); Tandjilé (MRAC). China: Hong-Kong (GRCL). Djibouti (FCNB). Egypt: lectotype ♂ and paralectotypes 2♂, 7♀ of *S. schremmeri*, Aswan (NHMW); paratypes 2♀ of *S. schremmeri*, Wadi Halfa (NHMW); Al-Jizah (JFCG, MFCB, NHMW); Al-Qahira (FCNB, ISNB, JFCG, MFCB, MNHN, NHMB, NHMW); Al-Qalyubiyah (BMNH); Siwah (BMNH, JFCG). Ethiopia: Bale (MRAC); Gamo Gofa (MNHN, MRAC); Ilubabor (BMNH, MRAC); Shewa (BMNH); Sidamo (MRAC). Gabon: Ogooué-Ivindo (MHNG). Ghana: lectotype ♂ (NHMW) and paralectotypes 2♀ (NHMW) and 1♂ (ISNB) of *S. tenuis*, "Adda"; Ashanti (HNHM, JFCG, MHNG); Brong-Ahafo (HNHM); Northern Region (FMNH, HNHM); Volta (HNHM); Western Region (HNHM). Guinea (HNHM, JFCG, ZMHB). India: Andhra Pradesh (BMNH); Goa (HNHM); Madhya Pradesh (HNHM); Orissa (HNHM); Tamil Nadu (HNHM, MHNG, NHMB). Indonesia: Jawa (BMNH, ISNB, NHMW); Jawa Barat (NHMC); Borneo (ISNB); Lombok (GRCL, SMNS); Sulawesi Tengah (BMNH); Sumatra (ZMHB); Sumba (NHMB); Sumbawa (SMNS). Iran: lectotype ♂ (SMNS) and paralectotypes 1♂, 6♀ of *S. schaeuffelei*, Sistan Va Baluchestan, Iranshar (NHMW, SMNS); paralectotypes 1♂, 3♀ of *S. schaeuffelei*, Jiroft, Anbar-Abad (NHMW, SMNS); lectotype ♀ (SMNS) and paralectotypes 2♀ of *S. richteri*, Jiroft, Anbar-Abad (NHMW); Hormozgan (MNHN, NMPC); Kerman (NHMW); Sistan Va Baluchestan (JFCG, NHMW, NMPC). Ivory Coast: Bingerville (MRAC); Ferkéssédougou (MRAC); Lakota (FMNH). Japan: Kagoshima (NHMC); Okinawa (NHMC). Kenya: Eastern (JFCG); Lake Turkana (HNHM). Laos: Louangphrabang (VACH). Malaysia: Perak (NHMC); Sabah (MHNG). Mali: Kayes (ISNB); Ségou (MRAC). Mauretania (MNHN). Morocco: Agadir (GRCL, MNHN); Tiznit (MNHN). Namibia: Kavango (JFCG, ZMHB). Nepal: Bagmati (JFCG); Nigeria: Kaduna (BMNH); Oyo (BMNH); Plateau (JFCG, VACH); Oyo (BMNH, MZCO). Philippines: Bukidnon (NHMB); Laguna (GRCL); Palawan (MZCO, NHMB); Panay (NHMB); Quezon (NHMB); Rizal (BMNH, NHMW, ZMHB). Rwanda (MRAC, ZMHB). Saudi Arabia: Al-Hufuf (NHMB); Riyadh (NHMB). Senegal: Saint-Louis (MNHN); Thiès (MNHN). Somalia: Bari (ISNB). South Africa: Kaap (BMNH); Transvaal (BMNH, FMNH, NHMB, NHMW, TMSA). Sudan: Al-Jazirah (BMNH); Al-Khartoum (ZSMC); An-Nil Al-Azraq (ZMHB); Ash-Shamaliyah (NHMW, ZSMC); Wad Madani (ZMHB). Taiwan (NHMC). Tanzania: Arusha (HNHM, MRAC); Morogoro (HNHM, MRAC); Tanga (HNHM). Thailand: Chanthaburi (NHMC); Chiang Dao (NHMB); Chumphon (MSCB, NHMB); Fang (NHMB); Khao Yai (MHNG); Khon Kaen (ZMHB); Ranong (NHMB); Uthai Tani (JFCG, NHMB, ZMHB). Turkey: Mugla (JFCG). Uganda: Central Buganda (BMNH). Vietnam: Bac Phan

(ISNB, HNHM); Nam Phan (MHNG, MNHN); Trung Phan (HNHM). Yemen: Adan (BMNH, JFCG); Ahwar (BMNH). Zaïre: Equateur (MRAC); Haut-Zaïre (MRAC); Kasai-Oriental (MRAC); Kivu (MRAC); Shaba (MRAC). Zambia: Northern (ZMHB). Zimbabwe: Mashonaland South (BMNH); Mashonaland North (JFCG, ZMHB).

DISTRIBUTION. Presumably due to its ability to fly and its obvious flying skill (light traps!) *Scopaeus filiformis* became widespread throughout the tropics and subtropics of the Afrotropical, Indian and Oriental regions. The occurrence in the New World appears improbable but cannot be excluded as no material from Nearctical and Neotropical regions was examined. Described from the Cape Verde Islands, *S. filiformis* is recorded throughout Africa from Morocco (Agadir), the Central Sahara (Tassili Najjer) and Egypt (Nile Delta) in the north southwards to the Cape province in South Africa, and there are obviously no large distributional gaps. *Scopaeus filiformis* is known from the Arabian Peninsula northwards to Riyadh. The record from South-West Turkey (Fethiye region) is the only confirmation from the Mediterranean region and the northernmost known locality. In Asia, the species is confirmed from South Iran, from Central and South India, and further eastwards from North Thailand (Chiang Dao), North Vietnam (Bac Phan), Hong Kong, Taiwan and South Japan (Kagoshima) southwards over the Philippines, Sumatra, Borneo and Sulawesi to the Lesser Sunda Islands.

FAGEL (1959) mentioned *S. filiformis* from Senegal and countries neighbouring the gulf of Guinea. Later (FAGEL 1973), his concept on the distribution of *S. filiformis* included just the Cape Verde Islands and the Senegal, and he referred other records to different species from the respective group.

BIONOMICS. Similar to *Scopaeus debilis*, *S. filiformis* is a hygro-thermophilous species inhabiting damp, sandy to gravelly river banks, which are exposed to sun. WOLLASTON (1867) already mentioned *S. filiformis* from river banks. In Turkey (Fethiye region), the author collected the species together with *S. debilis* on a gravelly, damp bank of a dry stream. Thus, in Anatolia both species occur sympatrically and syntopically. *Scopaeus filiformis* shows distinct flying skill and was repeatedly captured in large numbers with light traps.

COMMENTS. The type specimens in the Wollaston collection (BMNH) bear no locality labels, but according to the description, WOLLASTON (1867) described *Scopaeus filiformis* from the Cape Verde Islands St. Antao, St. Vincente, St. Iago, Fogo and Brava. A paralectotype from the Hope Entomological Collections, Oxford, is labelled "St. Antao".

FAUVEL (1902) and SCHEERPELTZ (1925) considered *S. filiformis* as a synonym of *S. debilis*. FAGEL (1959) revalidated *S. filiformis* and described the primary and secondary male sexual characters, but his illustration of the aedeagus is inaccurate, as well as the aedeagal features, with which he (FAGEL 1959, 1973) tried to distinguish the synonyms *S. tenuis* and *S. filiformis*. Furthermore, FAGEL (1973) erroneously tried to distinguish *S. filiformis* from other species of the group by the shape of the head, which he characterized as broadest at the tempora.

The synonym *S. schaeuffelei* is based on specimens from Egypt, of which the aedeagus is characterized by very little raised apical lobes (figs 8, 9). Although this

shaping of the aedeagus is typical for most specimens from Egypt, it occurs throughout the range of *S. filiformis* and is no character to define a species.

COIFFAIT (1960, 1984) applied the name *S. infirmus* Erichson, 1840 to specimens of *S. filiformis* from Egypt (Cairo), as Coiffait's illustration of the aedeagus shows undoubtedly. In fact, *S. infirmus* belongs to the genus *Luzea* Blackwelder, and it was first treated as *L. infirma* (Erichson) by JARRIGE (1960). In order to confirm this combination, the lectotype (♂, Egypt, leg. Ehrenberg; 2 paralectotypes, end of abdomen lost, same data as lectotype; ZMHB) is here designated, and its aedeagus (figs 48-50) is compared with that of the closely related *L. caucasica* (Luze) (figs 51-53), of which lectotype (♂, "Caucasus"; NHMW) was also examined.

Scopaeus udus Fagel

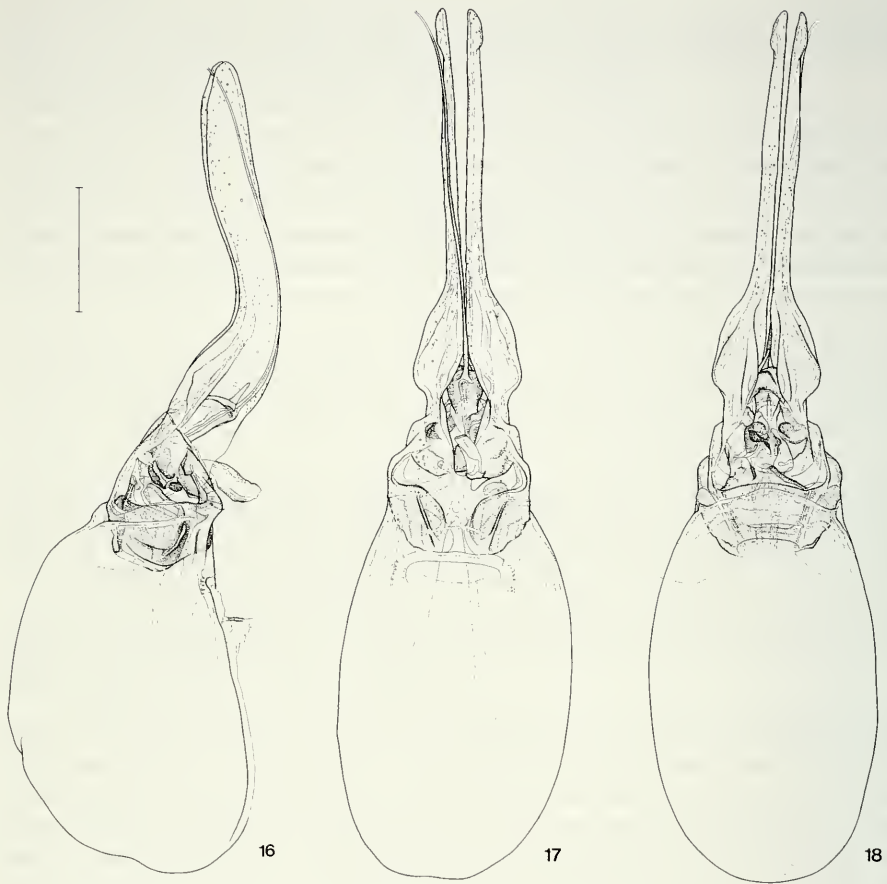
Figs 10-12, 22, 25, 28, 33, 38, 45

Scopaeus udus Fagel, 1973: 42. Holotype ♂, Zimbabwe, Nuanetsi River, Majinji Pan., 04.-05.1961 (BMNH); examined.

DESCRIPTION. Length 2.8-2.9 mm; forebody 1.5-1.6 mm. Body usually unicolorously light brown, the head somewhat darker, the pronotum slightly lighter yellowish brown, but little contrasting. In some specimens the head and the elytra except about the distal fourth and the suture are darker brown. Distal antennomeres slightly transverse. Hind margin of the male sternite 7 (fig. 25) with a short emargination in the middle third, which is extended into a large, shallow impression surrounded by median pointed, long setae proximally and laterally. Male sternite 8 (fig. 22) with a very narrow, median incision at about the distal fifth and straight hind margins. Aedeagus (figs 10-12) bearing somewhat ventrally bent, triangular apical lobes, of which the dorsal margins are slightly concave in lateral view. Apical lobes in dorsal view widely separate at the base with nearly parallel inner and outer margins and truncate apices, which each bear a short, apical dent. Dorsal lobe reduced to a nearly semicircular vestige, which is visible only in dorsal view. Lateral lobes somewhat prominent in lateral view but not projecting in dorsal view, each bearing a group of very long setae, which is oriented ventro-apically. Endophallic spine very strong and slightly thickened at the basal two-thirds, distal third almost filiform and bent distally between the apical lobes. Ventral endophallic process acuminate and little prominent, straight but not hook-shaped as in *S. debilis* (fig. 1) and *S. filiformis* (figs. 4, 7, 8). Ventral opening of the phallobase dilated distally into a strongly prominent, triangular tooth. Spermatheca as in fig. 45.

RATIOS. HLW 1.13-1.19; PLW 1.16-1.26; HPW 1.06-1.11; HPL 1.02-1.07; PSL 0.87-0.95; PLL 0.7-0.75; ELW 1.14-1.28; ET 0.79-0.85; MT 5.6-7.2; A 2.7, 1.4, 1.8, 1.5, 1.3, 1.0, 0.9, 0.9, 0.9, 0.9, 2.0; T 2.1; V (♀) 6.4.

MATERIAL EXAMINED (5477 specimens). Angola: paratype ♂, Cunene, Donguena, Mare Báné (MRAC); Cunene (BMNH). Botswana: Central (BMHN); Chobe (ZMHB); Ghanzi (BMNH); Ngamiland (BMNH); North-East (BMNH). Mozambique: Sofala (MNNH). Namibia: Grootfontein (BMNH); Hereroland Wes (JFCG, ZMHB); Kaokoland (SMWN, TMSA); Karasburg (BMNH); Kavango (ZMHB); Keetmanshoop (ZMHB); Maltahöhe (ZMHB); Mariental (NMEC); Namaland (SMWN); Okahandja (BMNH, ZMHB); Omaruru (BMNH); Outjo (BMNH, NHMW, SMWN, TMSA, ZMHB); Owambo (SMWN, ZMHB); Tsumeb (BMNH, ZMHB). South Africa: Cape (ZMHB); Natal (BMNH); Transvaal (BMNH, FMNH, TMSA). Zambia:



FIGS 16-18

Scopaeus madagascarensis sp. n., ♂ holotype: aedeagus in 16) lateral, 17) ventral, 18) dorsal view. Scale bar = 0.1 mm.

Northern (ZMHB); Western (ZMHB). Zimbabwe: holotype ♂, Nuanetsi River, Majinji Pan. (BMNH); paratypes 2♂, 5♀ (MRAC), 8♂, 33♀ (BMNH). Nuanetsi River, Majinji Pan.: paratypes 2♀, Nuanetsi River, Malipati (BMNH); paratype ♂ (MRAC), paratypes 1♂, 3♀ (BMNH), Matabeleland South, Matopo Hills, Maleme Dam.: Matabeleland North (ZMHB).

DISTRIBUTION. *Scopaeus udus* is widespread in the southern Afrotropical region. The species is confirmed from South Africa northwards to South Angola (Cunene), North Zambia and Central Mozambique (Sofala).

BIONOMICS. Little is known about the habitat of *Scopaeus udus*. According to the locality labels, the species most likely occurs on damp river banks, and it was repeatedly captured with light traps.

COMMENTS. The aedeagus of the holotype lacks the in dorsal view right apical lobe. A paratype specimen from Zaire (Matabeleland North, Hwange) belongs to *Scopaeus punctatellus* Fauvel.

Scopaeus mendosus Fagel

Figs 13-15, 23, 26, 29, 34, 40, 46

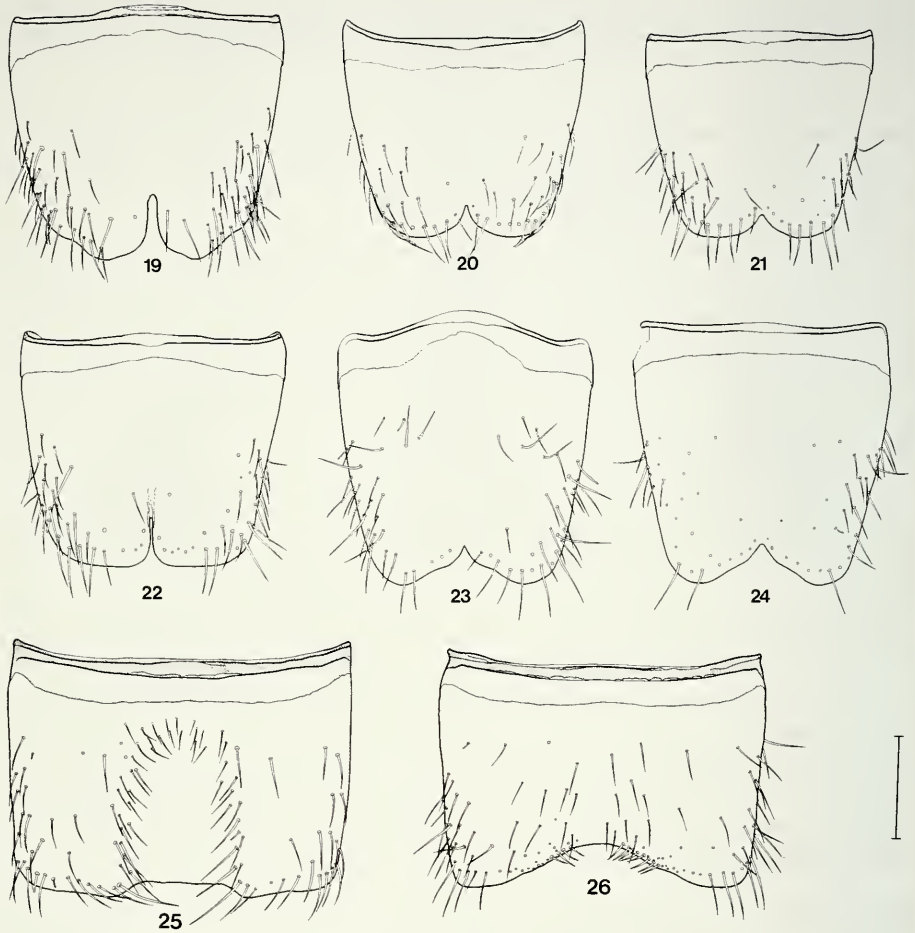
Scopaeus mendosus Fagel, 1973: 43. Holotype ♂, Zaire, Kivu, Mwenga, Kitutu, 650m, 04.1958, Leleup (MRAC); examined.

DESCRIPTION. Length 2.4-2.8 mm; forebody 1.4-1.6 mm. Body light brown, the elytra except the hind margin and the suture and the head somewhat to clearly darker, the pronotum and the appendages lighter yellowish brown. Elytra usually evenly lightened more or less toward the yellowish brown distal margins, but frequently the light distal seventh and the suture are set off against the darker elytral surface. Distal antennomeres quadrate. Hind margin of the male sternite 7 (fig. 26) widely emarginate, bearing short setae, which stand close together. Male sternite 8 (fig. 23) with a wide distal emargination having an acute-angled apex and slightly concave lateral margins. Aedeagus (figs 13-15) with extended apical lobes, which in lateral view are somewhat bent ventrally at the basal half and recurved distally at the apical half. Basal half bearing a strong, ventral enlargement, distal half regularly widening but shortly narrowed toward the rounded apex. Apical lobes oblong-triangular in dorsal view, each with a basal angle, from which the straight lateral margins are narrowed regularly toward the acute apices. Dorsal lobe as long as the basal quarter of the apical lobes, broad at the base with rounded lateral margins in dorsal view and being strongly curved ventrally and acuminate in lateral view. Lateral lobes without groups of setae, being prominent and regularly rounded in lateral view. Endophallic spine relative strong at the basal third but filiform distally, reaching the apex of the apical lobes. Ventral endophallic process conspicuously enlarged in lateral view, membranous with only the dorsal margin stronger sclerotized. Spermatheca as in fig. 46.

RATIOS. HLW 1.18-1.23; PLW 1.21-1.28; HPW 1.02-1.09; HPL 0.98-1.05; PSL 0.88-1.02; PLL 0.74-0.84; ELW 1.16-1.25; ET 0.7-0.81; MT 5.7-6.7; A 2.7, 1.8, 2.3, 1.8, 1.4, 1.3, 1.0, 1.0, 1.0, 1.0, 1.8; T 2.1; V (♀) 6.4.

MATERIAL EXAMINED (180 specimens). Cameroon: Nord (MRAC). Central African Republic (ZMHB). Gabon: paratypes 1♂, 4♀, Ogooué-Ivindo, Makokou (MRAC). Ivory Coast: paratype ♂, Ferkessédougou (MRAC); paratype ♂, Adiopodoume (MRAC). Kenya: Coast (MNHN). Madagascar: Antananarivo (ISNB); Antsiranana (JCU, JFCG, MNHN); Fianarantsoa (MRAC); Mahajanga (MNHN); Toamasina (MNHN); Toliara (MNHN). Namibia: Kavango (JFCG, ZMHB). Tanzania: paratypes 2♂, Arusha, Longido (MRAC); Arusha (HNHM); Kilimanjaro (MNHN). Zaire: holotype ♂ and paratypes 2♂, Kivu, Mwenga, Kitutu (MRAC); paratype ♂, Haut-Zaire, Kasenyi (MRAC). Zambia: Northern (ZMHB).

DISTRIBUTION. *Scopaeus mendosus* is distributed in Equatorial Africa between Sahel and about 20 degrees south and occurs also in Madagascar. The northernmost records are from Ivory Coast, North Cameroon, the Central African Republic and South Kenya. *Scopaeus mendosus* is confirmed as far south as North Namibia (Kavango), North Zambia and North-East Tanzania.



FIGS 19-26

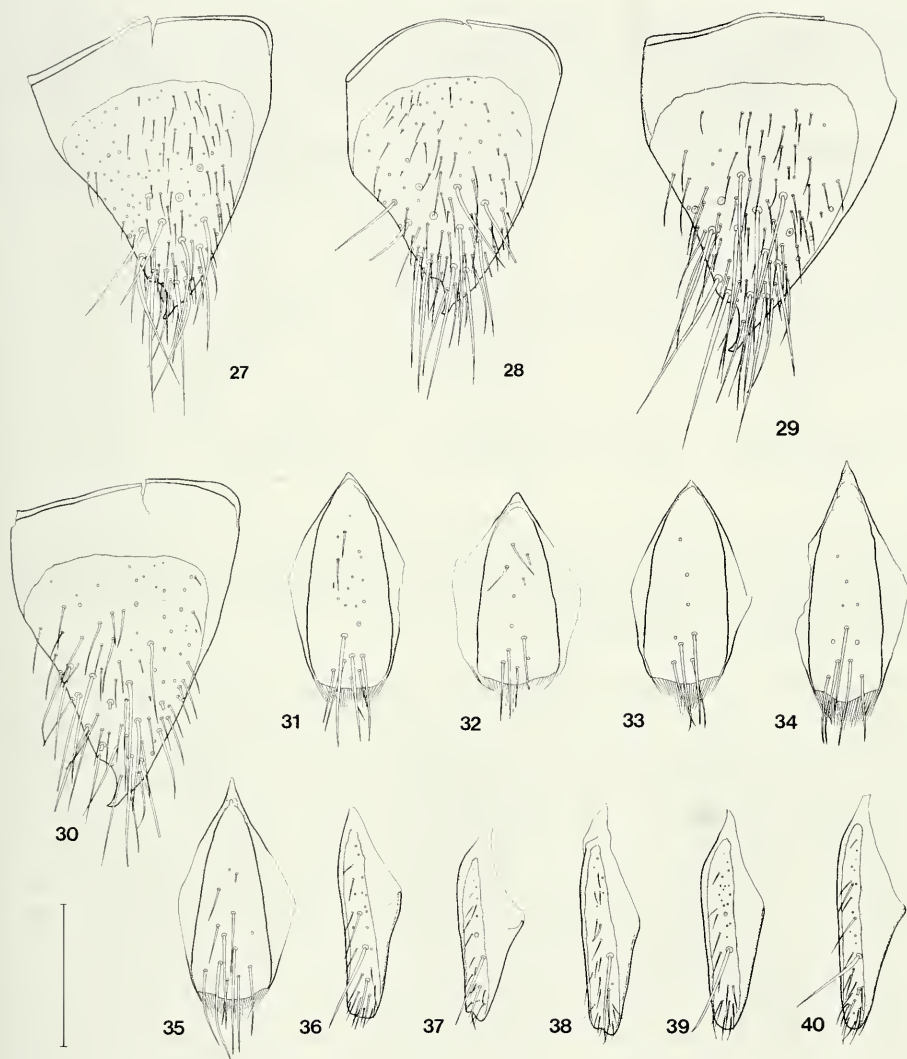
♂ sternite 8: 19) *Scopaeus debilis*, Tunisia, Kasserine; 20) *S. filiformis*, lectotype; 21) *S. filiformis*, Namibia, Kavango; 22) *S. udus*, Namibia, Kavango; 23) *S. mendosus*, paratype, Gabon, Ogooué-Ivindo; 24) *S. madagascarensis* sp. n., holotype. ♂ sternite 7: 25) *S. udus*, Namibia, Kavango; 26) *S. mendosus*, paratype, Gabon, Ogooué-Ivindo. Scale bar = 0.1 mm.

BIONOMICS. According to the locality labels, this species was frequently taken with light traps near rivers and creeks. Like related species it obviously lives on damp, sunny river banks.

***Scopaeus madagascarensis* sp. n.**

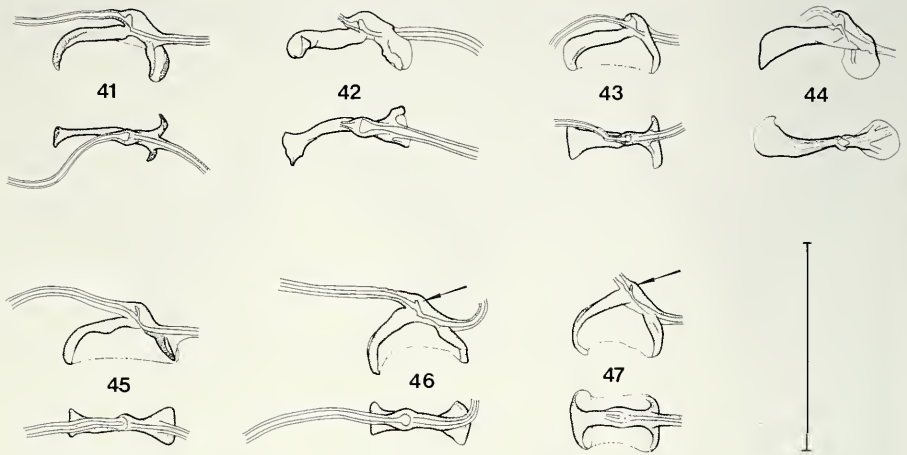
Figs 16-18, 24, 30, 35, 39, 47

DESCRIPTION. Length 2.5-2.9 mm; forebody 1.5-1.6 mm. Body unicolorously light orange brown, the appendages except the antennae light yellowish brown. Forebody in opposition to the remaining species of this group clearly punctate and quite shining



FIGS 27-40

♀ laterotergite 9: 27) *Scopaeus debilis*, Turkey, Mugla; 28) *S. udus*, paratype, Zimbabwe, Nuanetsi River; 29) *S. mendosus*, paratype, Gabon, Ogooué-Ivindo; 30) *S. madagascarensis* sp. n., paratype, Madagascar, Mahajanga. ♀ tergite 10: 31) *S. debilis*, Turkey, Mugla; 32) *S. filiformis*, paralectotype; 33) *S. udus*, paratype, Zimbabwe, Nuanetsi River; 34) *S. mendosus*, paratype, Gabon, Ogooué-Ivindo; 35) *S. madagascarensis* sp. n., paratype, Madagascar, Mahajanga. ♀ valve: 36) *S. debilis*, Turkey, Mugla; 37) *S. filiformis*, paralectotype. 38) *S. udus*, paratype, Zimbabwe, Nuanetsi River; 39) *S. madagascarensis* sp. n., paratype, Madagascar, Mahajanga; 40) *S. mendosus*, paratype, Gabon, Ogooué-Ivindo. Scale bar = 0.1 mm.



FIGS 41-47

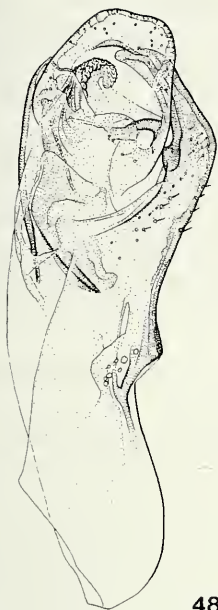
Spermatheca: 41) *Scopaeus debilis*, Turkey, Mugla; 42) *S. debilis*, lectotype; 43) *S. filiformis*, Turkey, Mugla; 44) *S. filiformis*, paralectotype; 45) *S. udus*, paratype, Zimbabwe, Nuanetsi River; 46) *S. mendosus*, paratype, Gabon, Ogooué-Ivindo; 47) *S. madagascarensis* sp. n., paratype, Madagascar, Mahajanga. Scale bar = 0.1 mm.

because of the absence of microsculpture. Distal antennomeres feebly transverse. Elytra somewhat shorter than those of the other members of this species group, at the suture about as long as pronotum and laterally exceeding the pronotal length by at most a fifth. Distal margin of the male sternite 8 (fig. 24) as in *S. mendosus*, but the median incision slightly wider and less acute. Aedeagus (figs 16-18) similar to that of *S. mendosus* (figs 13-15), but distinguished by the following characters: apical lobes conspicuously lengthened and slender with in lateral view almost parallel margins, being slightly bent ventrally at the basal half and recurved dorsally at the distal half. Apical lobes, in dorsal view, strongly dilated at the basal third, then very narrow and almost parallel at about the distal two-thirds toward the slightly widened apical portion. Dorsal lobe relatively short and narrow in dorsal view, strongly curved ventrally and bearing an apical spine, which is recurved distally. Lateral lobes little projecting and rounded in both lateral and dorsal view, bearing some short setules. Endophallic spine shortly thickened and rounded at the base, extended into a thin flagellum reaching the apex of the apical lobes. Ventral endophallic process membranous, narrow at the base and somewhat dilated distally. Spermatheca (fig. 47) with strongly curved, wide portions.

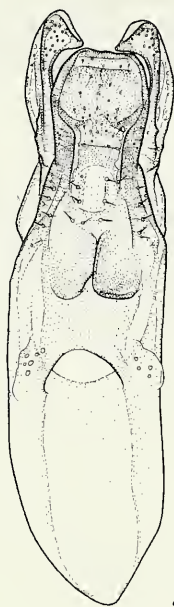
RATIOS. HLW 1.13-1.2; PLW 1.19-1.26; HPW 1.0-1.08; HPL 0.97-1.05; PSL 0.96-1.05; PLL 0.8-0.85; ELW 1.09-1.23; ET 0.72-0.85; MT 5.7-6.5; A 2.5, 1.4, 1.3, 1.1, 1.1, 1.0, 1.0, 0.9, 0.9, 0.9, 1.8; T 2.1; V (♀) 6.4.

FIGS 48-53

Luzea infirma, ♂ lectotype: aedeagus in 48) lateral, 49) ventral, 50) dorsal view. *Luzea caucasica*, ♂, Caucasus: aedeagus in 51) lateral, 52) ventral, 53) dorsal view. Scale bar = 0.1 mm.



48



49



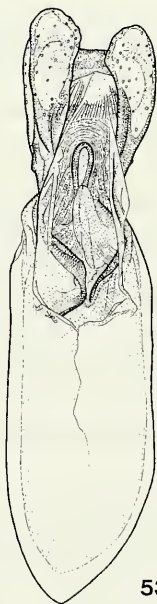
50



51



52



53

MATERIAL EXAMINED. Holotype ♂, Madagascar: Toliara, Sakaraha, Zombitsy, Griveaud (MNHN). Paratypes. 1 ♀, same data as holotype (MNHN). 1 ♂, 3 ♀, Madagascar: Cape Diego, 1916, Friederichs (ZMHB). 1 ♂, 1 ♀, Madagascar: Mahajanga, Tsaramandroso, Ampijoroa (JFCG, MNHN). 1 ♂, 1 ♀, Madagascar: Mahajanga, Katsepe, 24.-31.12.1997, Moravec (JCU).

DISCUSSION

The five species combined in the *Scopaeus debilis* group share some external morphological characters, which are used here to define a species group, and which were given in the chapter "Taxonomy of the *S. debilis* species group". Nevertheless, it appears difficult to judge whether the external characters as well as the features of the terminal sclerites are apomorphic and if they are suitable to define a monophyletic group.

While the species of this group agree completely by the general shape of the body, two subgroups are distinguishable according to the shape of the aedeagi and the male sternites 8. *Scopaeus debilis*, *S. filiformis* and *S. udus* appear closely related by the male sternites 8 (figs 19-22), of which the hind margin bears a narrow, short triangular emargination, that is extended into a very narrow, parallel incision in *S. debilis* and *S. udus*, and by the aedeagus (figs 1-12) having short, ventrally bent apical lobes, a short endophallic spine, a well sclerotized ventral endophallic process and prominent lateral lobes being studded with long setae. Unlike this, *S. mendosus* and *S. madagascarensis* share male sternites 8 (figs 23, 24), of which the hind margins have much wider triangular emarginations with slightly concave lateral margins. Furthermore, these two species from southern Africa and Madagascar are distinguished from the *S. debilis* subgroup by the following aedeagal features (figs 13-18): the apical lobes are conspicuously lengthened and curved dorsally at the apical half, and the endophallic spine is filiform and also strongly extended. The ventral endophallic process is membranous, and the lateral lobes bear no setae. The shape of the apical lobes appears apomorphic in both subgroups, and especially the membranous ventral endophallic process in *S. mendosus* and *S. madagascarensis* characterizes both as sister species. Both the *S. debilis* subgroup and the *S. mendosus* subgroup agree in the presumably apomorphic shape of the short, ventrally curved, acuminate dorsal lobe and of the endophallic flagellum, which is very robust at the base but filiform distally and reaching the apex of the apical lobes. The species agree furthermore in the small lateral branch of the ductus of the spermathecae (figs 41-47), which is regarded as synapomorphic feature as well, but as the spermathecae of many species groups remain unexamined, this synapomorphy is quite hypothetical. Thus, both subgroups are combined as sister groups in a monophyletic *Scopaeus debilis* species group.

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REFERENCES

- BAUDI, F. 1857. Coleoptera quaedam e Staphylinorum familia nova vel minus cognita cum observationibus. *Berliner Entomologische Zeitschrift* 1: 7-115.
- BERNHAEUER, M. & K. SCHUBERT 1910. Staphylinidae 1. In: Junk, W. & S. Schenkling (eds.), *Coleopterorum Catalogus* 19. Berlin, 86 pp.
- BINAGHI, G. 1935. Studio sul genere *Scopaeus* Erich. (Coleopt.: Staphylin.). *Memorie della Società Entomologica Italiana* 14: 84-115.
- BINAGHI, G. 1939. Materiali per lo studio degli *Scopaeus* paleartici (Col. Staphylinidae). *Mitteilungen der Münchner entomologischen Gesellschaft* 29: 734-738.
- BOHAC, J. 1985. Review of the subfamily Paederinae (Coleoptera, Staphylinidae) in Czechoslovakia. Part II. *Acta entomologica bohemoslovaca* 82: 431-467.
- BOHAC, J. *et al.* 1993. Staphylinidae. In: Jelinek, J. 1993. Check-list of Czechoslovak Insects 4 (Coleoptera). *Folia Heyrovskyana, Suppl.* 1. Prag.
- CICERONI, A., PUTHZ, V. & A. ZANETTI 1995. Coleoptera Polyphaga III (Staphylinidae). In: Minelli, A., Ruffo, S. & S. La Posta (eds.). Checklist delle specie della fauna Italiana 48, Bologna. 65 pp.
- COIFFAIT, H. 1952. Sur le genre *Scopaeus* Er. Notes sur les Staphylinides 1, 2. *Revue française d'Entomologie* 19: 5-16.
- COIFFAIT, H. 1960. Démembrement du genre *Scopaeus* et description de 4 espèces nouvelles (Coleopt.: Staphylinidae). *Revue française d'Entomologie* 27: 283-290.
- COIFFAIT, H. 1968. *Scopaeus* nouveaux ou mal connus de la région paléarctique occidentale. *Bulletin de la Société d'Histoire naturelle de Toulouse* 104: 405-426.
- COIFFAIT, H. 1981. Insects of Saudi Arabia. Coleoptera: Fam. Staphylinidae, Subfam. Xantholininae, Staphylininae, Paederinae, Oxytelinae, Aleocharinae (Part 2). *Fauna Saudi Arabia* 3: 236-242.
- COIFFAIT, H. 1984. Coléoptères Staphylinides de la région paléarctique occidentale V: Sous-famille Paederinae Tribu Paederini 2, Sous-famille Euaesthetinae. *Publications de la Nouvelle Revue d'Entomologie* VIII, 424 pp.
- EPPELSHEIM, E. 1885. Beitrag zur Staphylinidenfauna West Afrikas. *Deutsche Entomologische Zeitschrift* 29: 97-147.
- ERICHSON, G. F. 1840. Genera et species Staphylinorum Insectorum Coleopterorum Familiae. Berlin, 954 pp.
- FAGEL, G. 1959. Contribution a la connaissance des Staphylinidae LXI - Qu'est le *Scopaeus debilis* Hochhuth?. *Bulletin de l'Institut royal des Sciences naturelles de Belgique* 35: 1-7.
- FAGEL, G. 1973. Révision des *Scopaeus* (Coleoptera, Staphylinidae, Paederinae) de l'Afrique noire. *Etudes du Continent Africain. Bruxelles*, 247 pp.

- FAUVEL, A. 1873a. Faune gallo-rhénane 1. *Bulletin de la Société Linnéenne de Normandie* 2 (7): 8-132.
- FAUVEL, A. 1873b. Faune gallo-rhénane ou des insectes qui habitent la France, la Belgique, la Hollande, le Luxemburg, la Pousse rhénane, le Nassau et le Valais avec tableaux synoptiques et planches gravées 3: 295-392.
- FAUVEL, A. 1878. Les Staphylinides de l'Afrique Boréale. *Bulletin de la Société Linnéenne de Normandie* 3 (2): 83-269.
- FAUVEL, A. 1886. Les Staphylinides du Nord de l'Afrique. *Revue d'Entomologie* 5: 9-100.
- FAUVEL, A. 1902. Catalogue des Staphylinides de la Barbarie, de la Basse-Égypte et des Îles Açores, Madères, Salvages et Canaries 5. *Revue d'Entomologie* 21: 45-189.
- FRISCH, J. 1994. Neue Arten der Gattung *Scopaeus* Erichson aus Griechenland, Anatolien und dem Iran (Coleoptera, Staphylinidae, Paederinae). 1. Beitrag zur Kenntnis der Gattung *Scopaeus* Erichson. *Coleoptera* 2, 46 pp.
- FRISCH, J. 1996. Revision westmediterraner *Scopaeus* - Arten (Coleoptera, Staphylinidae: Paederinae) und Beschreibung einer neuen Art aus Südspeanien und Marokko. 2. Beitrag zur Kenntnis der Gattung *Scopaeus* Erichson. *Revue suisse de Zoologie* 103: 301-318.
- FRISCH, J. 1997. A revision of some Western Palaearctic species of *Scopaeus* Erichson (Coleoptera, Staphylinidae, Paederinae). *Revue Suisse de Zoologie* 104: 523-557.
- GANGLBAUER, L. 1895. Die Käfer von Mitteleuropa 2: Familienreihe Staphylinidea. 1. Theil: Staphylinidae, Pselaphidae. *Wien*, 880 pp.
- GUSAROV, V. 1992. New and little known Palaearctic Staphylinids (Coleoptera, Staphylinidae). *Entomologicheskoe Obozrenie* 71 (4): 775-788, 951.
- HOCHHUTH, I. H. 1851. Beiträge zur näheren Kenntniss der Staphylinen Russlands. *Bulletin de la Société Impériale des Naturalistes de Moscou* 24: 3-58.
- HORION, A. 1965. Faunistik der mitteleuropäischen Käfer X: Staphylinidae 2. Teil: Paederinae bis Staphylininae. *Überlingen*, 335 pp.
- JARRIGE, J. 1960. Contribution à l'étude des Brachélytres sahariens (3. Note) (Col. Staphylinidae). *Bulletin de la Société entomologique de France* 65: 37-40.
- JASZAY, T. & J. BOHAC 1994. Nové zaujímavé nálezy drobcíkovitých (Coleoptera, Staphylinidae) na Slovensku. *Zbor. Slov. Nár. Múz., Prir. Vedy* 40: 33-49.
- LOHSE, G. A. 1964. Staphylinidae 1 (Micropeplinae bis Tachyporinae). In: Freude, H., K. W. Harde & G. A. Lohse 1964: Die Käfer Mitteleuropas 4. *Krefeld*, 264 pp.
- LUCHT, W. H. 1987. Die Käfer Mitteleuropas. Katalog. Goecke & Evers. *Krefeld*, 342 pp.
- LUZE, G. 1911. Eine neue Art der Staphyliniden-Gattung *Medon* Steph. (*Micromedon* nov. subg.). *Verhandlungen der kaiserlich-königlichen zoologisch-botanischen Gesellschaft in Wien* 61: 396.
- MULSANT, E. & C. REY 1854. Essai spécifique sur les *Scopaeus* des environs de Lyon. *Annales de la Société Linnéenne de Lyon* 2: 161-190.
- MULSANT, E. & C. REY 1877. Histoire Naturelle de Coléoptères de France. Paederiens, Eu aesthetiens. *Annales de la Société Linnéenne de Lyon* 24, 712 pp., 6 pls.
- PORTA, A. 1926. Fauna Coleopterorum Italica II: Staphylinidea. *Piacenza*, 405 pp.
- PORTEVIN, G. 1929. Histoire naturelle des Coléoptères de France, I: Adephaga; Polyphaga: Staphylinidea. *Paris*, 649 pp.
- REITTER, E. 1909. Fauna Germanica. Die Käfer des Deutschen Reiches 2. *Stuttgart*, 392 pp., 80 pls.
- SCHEERPELTZ, O. 1925. Staphylinidae. In: Winkler, A. 1924-1932. *Catalogus Coleopterorum regionis palaearticae*. *Wien*, 1698 pp.
- SCHEERPELTZ, O. 1931. Staphylinidae (Coleoptera). In: Beier, M. 1931. Zoologische Forschungsreise nach den Jonischen Inseln und dem Peloponnes, XV. Teil. *Akademie der Wissenschaften in Wien. Mathematisch-naturwissenschaftliche Klasse. Sitzungsberichte*, Abteilung I, 140. Band: 359-460.

- SCHEERPELTZ, O. 1933. Staphylinidae 7 (pars 129). *In*: Junk, W. & S. Schenkling 1933-1934: Coleopterorum Catalogus Vol. 6: Staphylinidae 2, pars 129, 130. *Berlin*, 989-1881.
- SCHEERPELTZ, O. 1960. Die von Prof. Dr. A. Gilli während seine Aufenthaltes in Afghanistan 1949/1951 aufgesammelten Staphyliniden (Col. Staph.). *Koleopterologische Rundschau* 37/38: 67-81.
- SCHEERPELTZ, O. 1961. Die von den Herren W. Richter und Dr. F. Schäuuffele in den Jahren 1954 und 1956 im Südiran aufgefundenen Staphyliniden (Col.). *Stuttgarter Beiträge zur Naturkunde* 50: 1-31.
- SCHEERPELTZ, O. 1963. Ergebnisse der Zoologischen Nubien-Expedition 1962, Teil VIII. Coleoptera - Staphylinidae. *Annalen des Naturhistorischen Museum in Wien* 66: 425-450.
- WOLLASTON, T. V. 1867. Staphylinidae. Coleoptera Hesperidum. *London*, 285 pp.